Claims

1. A phosphocalcic compound, characterized in that it has the following chemical composition:

$Ca_{(10-a)}(Mg,K,Na)_b(PO_4)_{6-c}(HPO_4,CO_3)_d(OH)_{2-e}(F,Cl,CO_3)_f$ $[(OA)(OE)P(O)-CR^1R^2-P(O)(OA)(OE)]_g$, in which $0<a<9$; $0<b<2$; $0<c<5$; $0<d<2$; $0<e<2$; $0<f<2$; $g<0.5$, A and E represent H, an alkali metal, an alkaline-earth metal or nothing, R^1 represents H, OH or a halogen and R^2 represents an element chosen from a hydrogen, a halogen, an alkyl radical, an aminoalkyl radical in which the amino group optionally bears an alkyl substituent, an alkylamino radical, an alkyl radical bearing an aromatic substituent comprising at least one N atom, and an alkyl radical bearing an aromatic thioether group.

2. The compound as claimed in claim 1, characterized in that R^1 and/or R^2 represent Cl.

3. The compound as claimed in claim 1, characterized in that R^2 is a radical containing from 1 to 6 carbon atoms.

4. The compound as claimed in claim 1, characterized in that R^2 is an aminoalkyl radical $NH_2(CH)_n$- in which n is less than 6.

5. The compound as claimed in claim 1, characterized in that R^2 is an alkylaminoalkyl radical $R'R''N(CH_2)_m$- in which R′ and R″ represent, independently of each other, H or an alkyl radical containing up to 5 carbon atoms, and m is less than 6.

6. The compound as claimed in claim 1, characterized in that R^2 is an alkylamino radical R^cNH- in which R^c is a cycloalkyl containing from 3 to 7 carbon atoms.

7. The compound as claimed in claim 1, characterized in that R^2 is an alkyl radical containing up to 3 carbon atoms and bearing a pyridyl or imidazolyl group.

8. The compound as claimed in claim 1,

characterized in that R^2 is an alkyl radical containing up to 3 carbon atoms and bearing a phenylthio group in which the phenyl group optionally bears a halogen substituent.

9. The compound as claimed in claim 1, characterized in that R^1 is OH, R^2 is -CH_2-imidazole, A and C represent H.

10. A process for preparing a modified phosphocalcic compound as claimed in claim 1, characterized in that it consists in adding a gem-biphosphonic acid or an alkali metal or alkaline-earth metal salt thereof to a suspension of a precursor phosphocalcic compound in ultrapure water, stirring the reaction medium at room temperature and then recovering the formed compound therefrom by centrifugation.

11. The process as claimed in claim 10, characterized in that the compound formed is purified by washing with ultrapure water, followed by filtering and drying in air at room temperature.

12. The process as claimed in claim 10, characterized in that the precursor phosphocalcic compound is chosen from calcium orthophosphates with a solubility in water of greater than 4×10^{-59} $mol.l^{-1}$.

13. The process as claimed in claim 12, characterized in that the phosphocalcic compound is chosen from BCP, CDA, which is a calcium-deficient hydroxyapatite, and β-TCP.

14. The process as claimed in claim 10, characterized in that the stirring at room temperature is maintained for a period of between 1 hour and 72 hours.

15. The process as claimed in claim 10, characterized in that the acids or salts used as gem-biphosphonic compounds correspond to the formula $(OY)(OX)P(O)-CR^1R^2-P(O)(OX)(OY)$ in which X or Y represent, independently of each other, H or an alkali metal or alkaline-earth metal cation, R^1 represents H,

OH or a halogen, and R^2 represents:

- a hydrogen or a halogen,
- an alkyl radical,
- an aminoalkyl radical in which the amino group optionally bears an alkyl substituent,
- an alkylamino radical,
- an alkyl radical bearing an aromatic substituent comprising at least one N atom,
- an alkyl radical bearing an aromatic thioether group.

16. A composition that may be used by injection for the treatment of osteoporosis or relapses of lytic tumors by inhibition of osteoclast activity, characterized in that it consists of a suspension of the modified phosphocalcic compound as claimed in claim 1, in a biocompatible gel or solution having a viscosity that allows the transportation of granules of between 40 μm and 500 μm in size.

17. The composition as claimed in claim 16, characterized in that the biocompatible gel is a hydrogel of biological interest.

18. The composition as claimed in claim 17, characterized in that the gel is a cellulose-based hydrogel or a hydrogel based on sodium hyaluronate.